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(54) Improvements in and relating to curtain walls and the like.

(57) A curtain wall system comprises a grid-like framework, openings of which are fitted with glazing or other panels (24,26). Each panel (24,26) is surrounded by a continuous gasket (52), which extends

from an intended inner face of the panel (24,26) to a cover plate (70) for retaining the panel (24,26) in the framework.

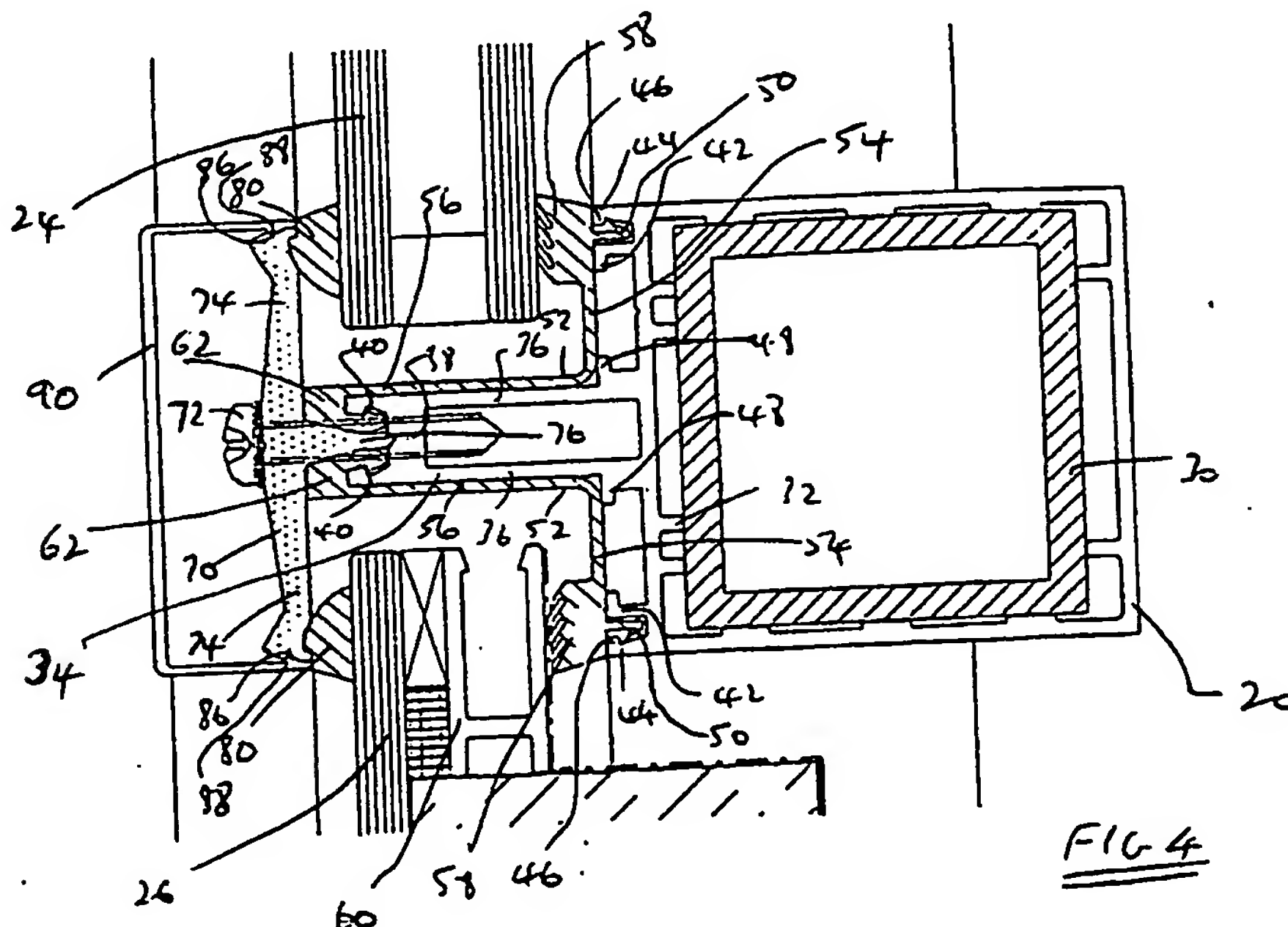


FIG 4

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## Improvements in and relating to curtain walls and the like.

### DESCRIPTION

This invention concerns improvements in and relating to curtain walls or any type of framework in which glazing or other panels are fitted.

Curtain walls generally comprise a grid-like framework typically of aluminium profiled members providing transomes and mullions against which are secured glazing panels and non-transparent panels in a desired arrangement. The panels are held in place by cover plates secured to the mullions or transomes. Problems occur with such systems due to water penetration past gaskets of the system and also condensation on metal parts of the curtain wall eventually leading to water damage behind the curtain wall. To counter that often elaborate thermal break systems have to be provided between and in parts of a curtain wall system.

An object of this invention is to provide a curtain wall system wherein water condensation may be prevented from penetrating the system when formed on exterior parts thereof.

Another object of this invention is to provide a curtain wall system having thermal break means that can inhibit water condensation on inner parts of the system.

According to this invention one proposal is to surround a curtain wall panel with a continuous gasket, which gasket extends around the panel edges from an intended inner face of the panel to a cover plate for retaining the panel.

The gasket is preferably of a rubber material either natural or synthetic. The latter is preferred and suitable examples include ethylene propylene diene rubbers, neoprene and heat treated silicone.

The gaskets of the invention may be formed in one piece or from a strip bent and joined at its ends to give the desired shape. The gaskets of the invention are preferably L-shaped in section, preferably providing one web having at least an end portion ribbed for compression against a panel on its intended inner face. On the opposite face of said one web, the gasket preferably has a hooked rib for engagement and retention in a corresponding channel of a mullion or transome member of the curtain wall system.

The other web of the L-section gasket has a returned end for overlying an end edge of an extension of a mullion or transome to which the cover plate is secured. The returned end of the gasket is preferably hooked for retention over said end edge which preferably has a complimentary formation. The cover plate preferably has an up-standing longitudinal projection that fits between

adjacent said gasket returned ends.

The cover plate used in the present invention is preferably not of metal but may conveniently be of plastics, preferably reinforced, such as with glass fibre. Then even though the mullions and transomes and their exteriors are of metal, metal to metal contact is reduced to screws or bolts through the cover plates to the mullions or transomes. The cover plates are preferably capped to provide concealment of fixings. The caps are preferably channel section members of resilient material having inward lips that engage corresponding slots of the cover plates at edges thereof.

According to another aspect of the invention, the mullions and transomes either have an integral projecting extension to which a cover plate is secured or have means for attachment of an extension thereto. Preferably the extension and transome or mullion have cooperating lugs and grooves whereby the extension and transome or mullion can be connected by sliding engagement. Preferably the transomes and mullions have a pair of inwardly extending facing lugs for engagement with corresponding grooves on opposite sides of the extensions.

The panels used in the curtain wall system of the invention include glazing panels which are preferably double glazed units and single non-glazing panels. For the latter spacing strips are preferably secured to the periphery thereof so that the same gaskets may be used for double glazed units as for other panels. Further gasket material will preferably be included between intended outer panel face and cover plates therefor. Such gaskets may be of the conventional wedge type, captive type fitted into continuous claw grooves of the cover plate or formed into edges of the cover plate when in the form of a plastics profile.

The present invention also provides a gasket for use in curtain wall systems, which gasket is continuous and surrounds individual curtain wall panels to separate them from curtain wall frame members.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a vertical section through a curtain wall system;

Figure 2 is a plan view of the curtain wall system of Figure 1;

Figure 3 is an elevation view of the curtain wall system of Figure 1;

Figure 4 is a section through a first mullion arrangement of a curtain wall system;

Figure 5 is a section through a second mul-

lion arrangement of a curtain wall system;

Figure 6 is a vertical section through a cill transome of a curtain wall system; and

Figure 7 is a perspective view of part of the curtain wall system of Figure 1.

Referring to Figures 1 to 3 of the accompanying drawings, which show a curtain wall system 8 in general, steel framing 10 supports concrete floors 12 on which are raised floors 14 and below which are suspended ceilings 16. Inner wall casings 18 extend upwards from the floors 12 to window height. The curtain wall system 8 comprises mullions 20 and transomes 22 of aluminium and connected grid-like to which are secured either glazing panels 24 for window opening or other facing panels 26 for the remainder of the wall.

Turning now to Figure 4 of the accompanying drawings, a first arrangement at a curtain wall mullion 20 is illustrated. The mullion 20 is secured to the outside of a building structure at spaced points along its length and at spaced intervals to transome members 22 to provide framed openings for panels 24, 26. In Figure 4 the mullion 20 is of hollow square section and jointing members 30 are shown. Projecting from one face of the mullion 20 is a fin 34. The fin 34 has two walls 36 connected near their outer ends by a bridge 38 that extend beyond the bridge whereafter their inner faces are longitudinally grooved at 40.

At each corner on each side of the fins 34, the mullion 20 has a pair of longitudinal ribs 42 and 44, the inner one 42 being an L-section spacer and the outer 44 having a lipped end 46. The fin 34 also has spacer projections 48 on its walls 36.

The lipped outer ribs 44 receive hooked rib 50 of a rubber material gasket 52 which is in the form of a continuous frame-like member of generally L-section providing first and second webs 54, 56. The hooked rib 50 is on one face of first web 54 and on its opposite face is a ribbed protrusion 58 which abuts one face of double-glazed panel 24 or peripheral spacer 60 of non-glazing panel 26. The first web 54 lies against spacers 42 and 48. The second web 56 of the gasket 52 has a returned end 62 formed on a hook that engages the longitudinal groove 40 of fin wall 36.

The panels 24 and 26 are held in position by means of cover plates 70 secured to the fins 34 by means of screws or bolts 72. The cover plates 70 have a pair of wings 74 so that one cover plate secures edges of adjacent panels 24, 26. Furthermore, the cover plates 70 have central longitudinal protrusions 76 that fit between adjacent gaskets 52 to hold them in position.

The cover plates 70 also trap between them and the panels 24 or 26 wedge type gasket strips 80. The cover plates 70 and the gaskets 80 have complimentary engaging formations 82, 84 respec-

tively for additional security. Also side edges of the cover plates 70 are notched at 86 to receive longitudinal ridges 88 of cover plate caps 90.

In Figure 5 of the accompanying drawings, an alternative mullion arrangement is illustrated to that of Figure 4. Therefore, for simplicity like parts have been given the same reference numerals and only the difference will now be described in detail. The main difference is that fin 34 of the mullion 20 is slidably connected to the mullion rather than integral therewith. For that the mullion has longitudinal projections 100 presenting facing lips 102 over which slide end formations 104 of the ribs 34.

Turning to Figure 6 of the accompanying drawings, which shows the curtain wall system arrangement through a transome 22, the arrangement is similar to that at a mullion. The transomes 22 also have fins 134 through which cover plates 70 are secured. The cover plates have holes 136 and the caps holes 138 therethrough, whereby moisture collecting in a gasket 52 can escape downwards and out of the curtain wall system.

Finally, in Figure 7 the junction of a mullion and transome is shown, using the embodiments of Figures 4 and 6.

In the embodiment of Figure 4 of the accompanying drawings, it can be seen that metal to metal contact through the curtain wall system is minimised to the bolts 72 secured to the fins 34. Even then non-metallic washers 92 are used between bolt heads and the cover plate and metal to metal contact is only with the bridge 38. Thus, improved thermal insulation may be provided.

Furthermore, the continuous gaskets 52 prevent ingress of moisture past panels of the curtain wall system and any moisture collecting around the gasket can escape via the holes 136, 138 in the cover plates 70.

## Claims

1. A curtain wall system in which a panel is surrounded with a continuous gasket, which gasket extends around the panel edges from an intended inner face of the panel to a cover plate for retaining the panel in a framework.

2. A system as claimed in claim 1, wherein the gasket is formed in one piece.

3. A system as claimed in claim 1, wherein the gasket is formed from a strip that is bent and joined at its ends.

4. A system as claimed in claim 1, 2 or 3, wherein the gasket are generally of L-section.

5. A system as claimed in claim 4, wherein the gasket has one web having at least an end portion ribbed for compression against a panel on its intended inner face.

6. A system as claimed in claim 5, wherein the gasket has on the opposite face of said one web a hooked rib for engagement and retention in a corresponding channel of a framework member.

7. A system as claimed in claim 4, 5 or 6, wherein the other web of the L-section gasket has a returned end for overlying an end edge of an extension of a framework member to which the cover plate is secured.

8. A system as claimed in claim 7, wherein the returned end of the gasket is hooked for retention over said end edge of the extension of the framework member.

9. A system as claimed in claim 7 or 8, wherein the cover plate has an upstanding longitudinal projection that fits between adjacent said gasket returned ends.

10. A system as claimed in any one of claims 1 to 9, wherein the cover plate is of plastics material.

11. A system as claimed in any one of claims 1 to 10, wherein the cover plates are capped.

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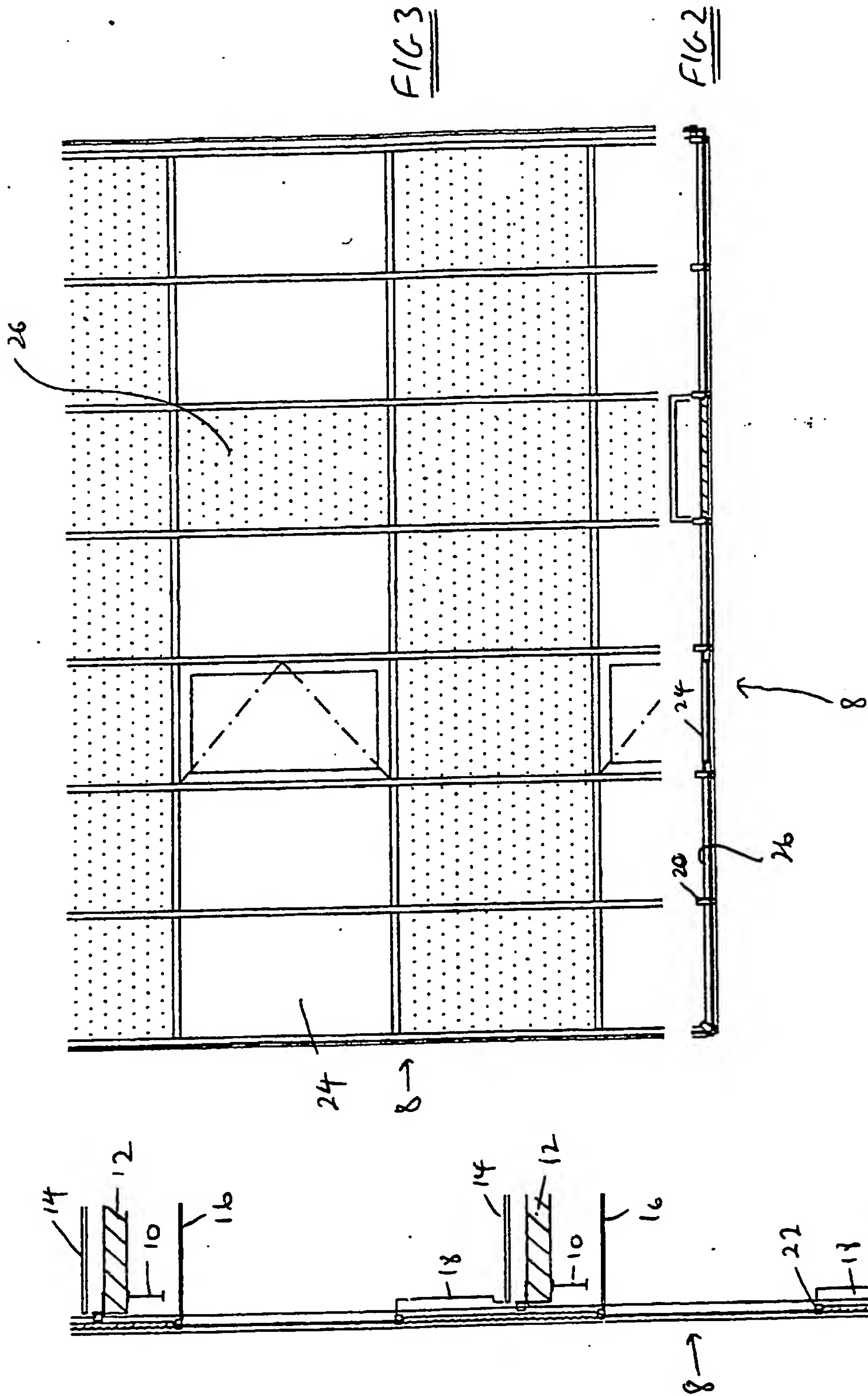
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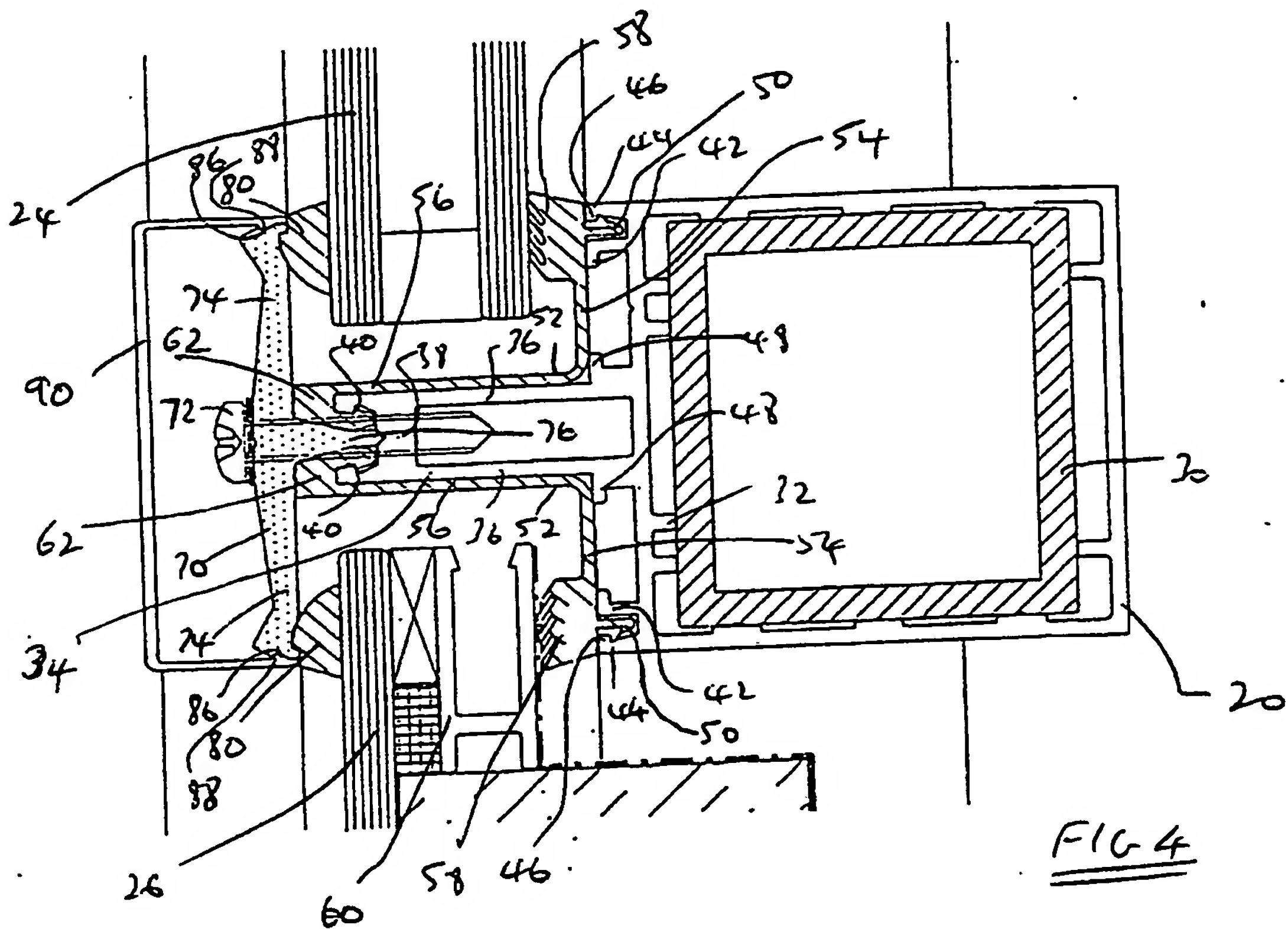


FIG 4

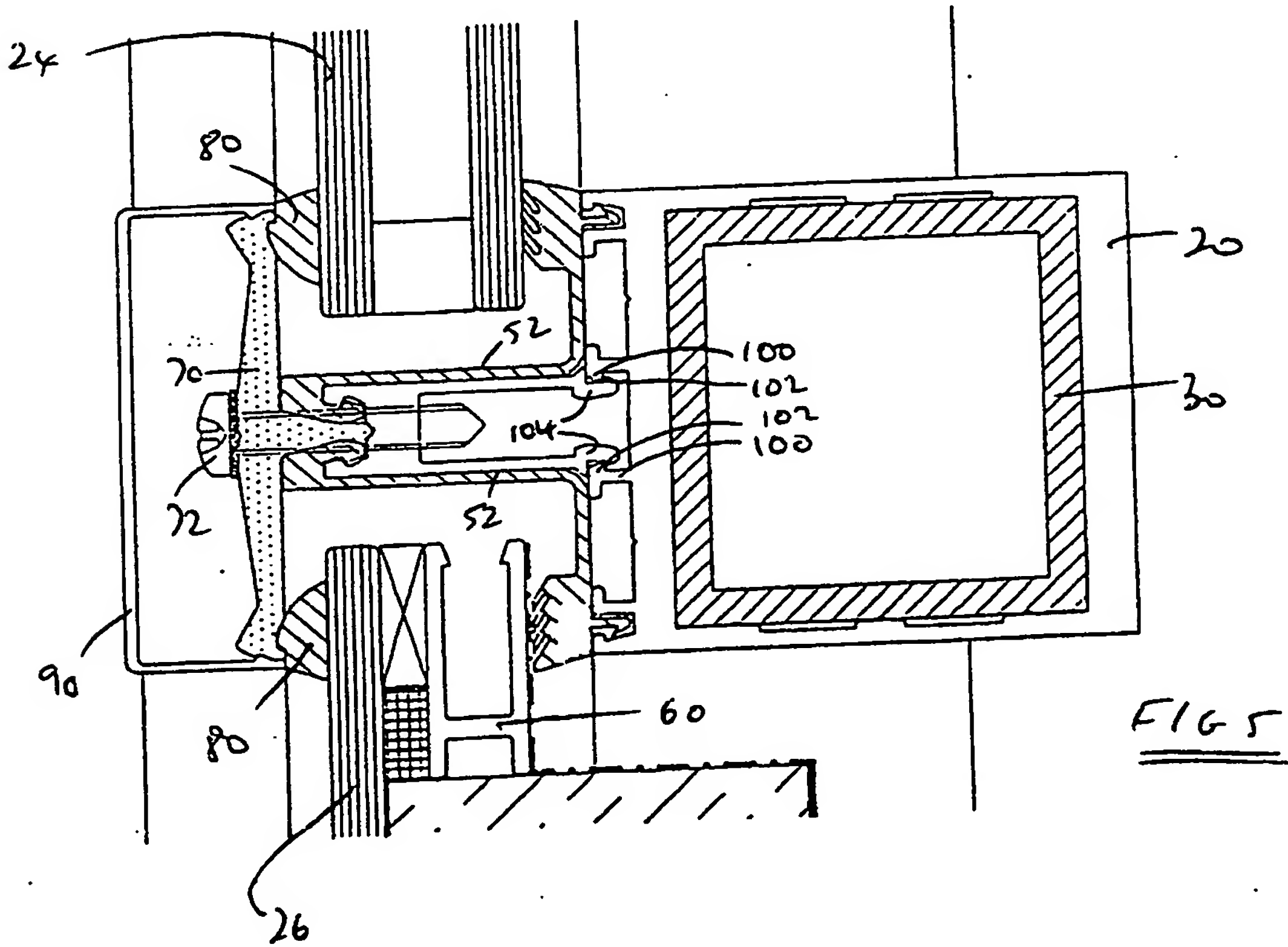


FIG 5

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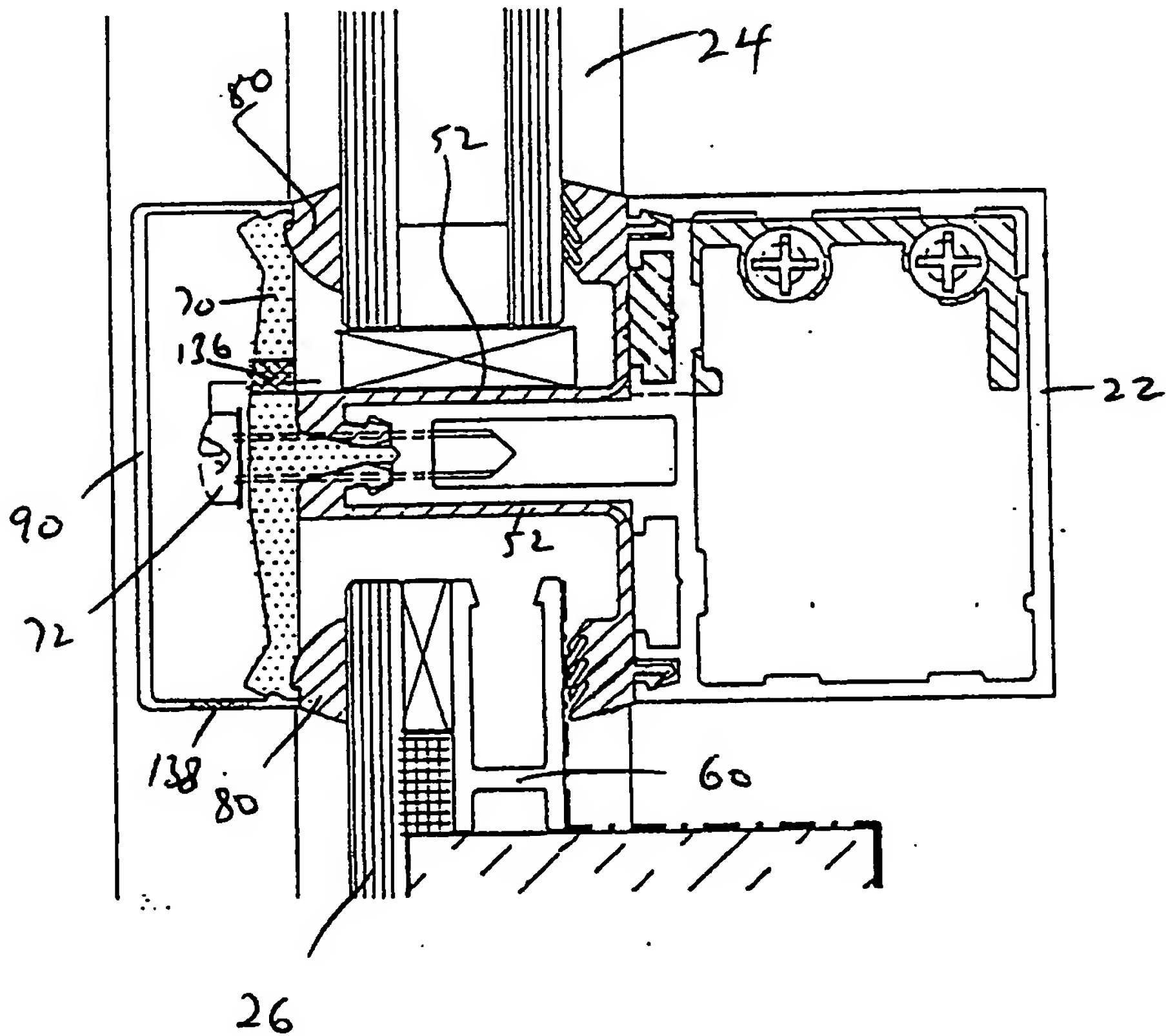


FIG 6

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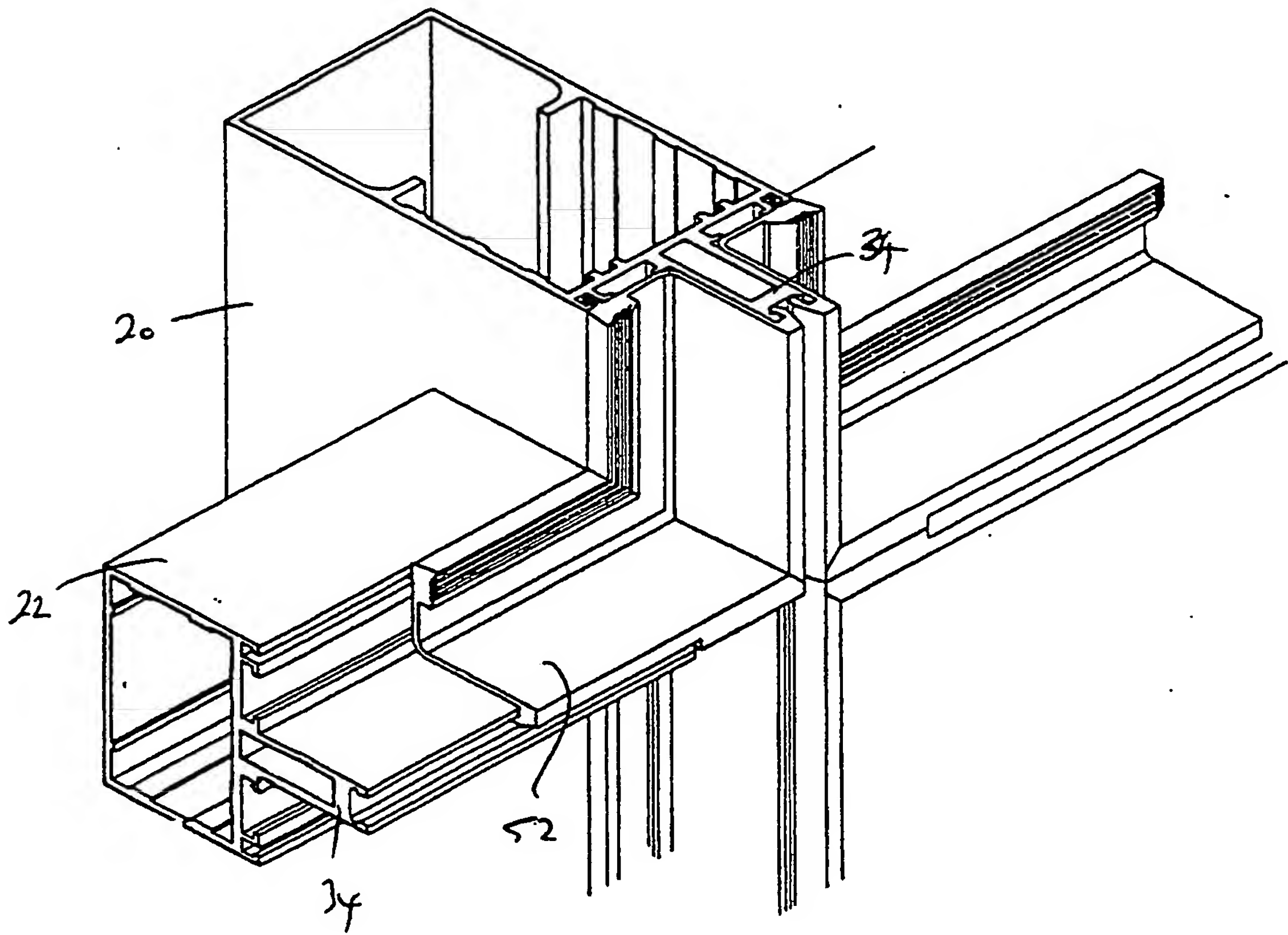


FIG 7





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# EUROPEAN SEARCH REPORT

Application Number

EP 90 30 5532

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	GB-A-2 133 449 (NEOLOK TECHNICAL SERVICES LTD) * Page 2, lines 89-128; figure 3 *	1,2,4-9,11	E 04 B 2/96
A	---	3	
Y	GB-A-2 157 338 (YOSHIDA KOGYO K.K.) * Page 3, lines 77-49; figures 2A,3 *	1,2,4-9,11	
A	CA-A-1 235 561 (SCHMIDT) * Page 6, lines 1-5; figure 1 *	10	
A	GB-A-2 137 673 (MODERN ART GLASS CO., LTD) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 04 B
Place of search THE HAGUE		Date of completion of the search 06-08-1990	Examiner PORWOLL H. P.
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  .....  &amp; : member of the same patent family, corresponding document</p>			